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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
RHEE, JANE J	

ART UNIT	PAPER NUMBER
1745	

DATE MAILED: 06/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/719,425	MARPLE, JACK W.	
	Examiner	Art Unit	
	Jane Rhee	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-29 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-29 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 3/22/06,1/26/04.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102/103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 1-8,10-16,19-26 are rejected under 35 U.S.C. 102(e) as being anticipated by or in the alternative, unpatentable under 103(a) over Paulot et al. (EP1296389).

As to claim 1, Paulot et al. discloses an electrochemical battery cell comprising a housing (page 3 line 2), negative electrode strip comprising metallic lithium (page 3 line 18-31), a positive electrode strip comprising an active material mixture (page 4 line 26-28) and an electrolyte comprising at least one salt dissolved in a nonaqueous electrolyte disposed within the housing (page 5 lines 10-15) and a separator disposed between the negative and positive electrodes (page 4 lines 37-38). As to claims 2-5, Paulot et al. discloses that the electrode active material comprises about 94-99 weight percent of iron disulfide (page 4 lines 28-31).

As to claim 6, Paulot et al. discloses that the housing comprises a container with a closed end, an initially open end closed by a cover, and a side wall extending between the closed and initially open ends (page 3 line 2), the negative electrode is in the form of at least one sheet with two opposing major surfaces, the positive electrode is in the form

of at least one sheet with two opposing major surfaces, and the negative and positive electrodes are disposed within the container with a portion of at least one major surface of the negative electrode sheet adjacent a portion of at least one major surface of the positive electrode sheet through the separator, and at least some segments of adjacent portions of the negative and positive electrodes are parallel to a longitudinal axis of the cell (page 4 lines 38-40). As to claim 7, Paulot et al. discloses that the negative and positive electrodes and the separator from a spiral wound electrode assembly (page 4 line 22). As to claim 8, Paulot et al. discloses that the container has a cylindrical shape and the electrode assembly has a radial outer surface disposed adjacent an inner surface of the container side wall (page 4 lines 38-40). As to claim 11, Paulot et al. discloses that the separator has a thickness of less than 22um (page 4 line 48). As to claim 19, Paulot et al. discloses that the microporouse membrane of the separator comprises polyethylene (page 4line 48).

As to claim 21, Paulot et al. discloses an electrochemical battery cell comprising a housing, a negative electrode, a positive electrode, and an electrolyte disposed within the housing (page 4 lines 38-40), and a separator disposed between the negative and positive electrode wherein the housing comprises a cylindrical container with an integral closed bottom end (page 4 lines 37-38), an initially open top end, a side wall extending between the bottom and top ends and a cover disposed in the top end to close the cell (page 3 line 2), the negative electrode is in the form of a strip with two opposing major surfaces comprises metallic lithium (page 3 lines 18-20 and page 4 lines 38-40), the positive electrode is in the form of a strip with two opposing major surfaces and

comprises an active material mixture, the active material comprising greater than 50 weight percent iron disulfide (page 4 lines 26-31 and liens 38-40), the electrolyte comprise one or more salts dissolved in a nonaqueous organic solvent (page 5lines 11-15), the negative and positive electrodes and the separator form a spiral wound cylindrical electrode assembly (page 4 lines 38-40), with a radial outer surface disposed adjacent an inner surface of the container side wall, the separator is a microporous membrane comprising polyethylene (page 4 lines 35-36). As to claims 22-23, Paulot et al. discloses the electrode active material comprises about 94-99 weight percent of iron disulfide (page 4 lines 28-31).

As to claims 1, 5,21,25 referring to the interfacial capacity of at least 720mAh/cm.sup.3, Paulot et al. discloses a metallic lithium anode material and an iron disulfide cathode active material (page 3 lines 18-20, page 4 line 28). Since Paulot et al. discloses the same materials desired by the applicant, it is inherent that the ratio of cathode interfacial capacity of an electrode assembly interfacial volume of at least 720 mAh/cm.sup.3.

As to claims 10, 12-16,20-21,24,26 referring to the tensile stress of at least 1.75kgf/cm, dielectric breakdown voltage of at least 2400 volts, and a BET specific surface area of 4.0 to 1.5m^2/g, Paulot et al. discloses a polyethylene microporous membrane with an average thickness of less than 22um (page 4 lines 36, line 48). Since Paulot et al. discloses the same materials desired by the applicant, it is inherent that separator has a the tensile stress of at least 1.75kgf/cm, dielectric breakdown voltage of at least 2400 volts, and a BET specific surface area of 4.0 to 1.5m^2/g.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Paulot et al. in view of Zhang et al. (US20020064706).

As to claim 9, Paulot et al. discloses a container that has a cylindrical shape and the electrode assembly has an outer surface disposed adjacent tan inner surface of the container side wall (page 4 line 40). Paulot et al. teaches that anode may also be formed in other geometric shapes such a s bobbin shape, cylinder or pellet to all alternate cell designs (page 3 lines 24-25). Paulot et al. fail to disclose a container that has a prismatic shape. Zhang et al teaches a container that has a prismatic shape for the purpose of providing a battery wherein a copper current collector would be in contact with the can or an aluminum current collector would be in contact with the can (page 2 paragraph 0017).

Therefore, it would have been obvious to one having ordinary skill in the art at the time applicant's invention was made to provide Paulot et al. with a container that has a prismatic shape in order to provide a battery wherein a copper current collector would

be in contact with the can or an aluminum current collector would be in contact with the can (page 2 paragraph 0017).

3. Claims 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paulot et al. in view of Callahan et al. (6602593).

Paulot et al. discloses the cell described above. Paulo et al. fail to disclose that the separator has a maximum effective pore size of from 0.08um to 0.40um and no greater than 0.2um. Callahan et al. teaches microporous membrane having an average pore size of from 0.05 to about 2 microns (col. 3 line 30-33) for the purpose of providing a microporous membrane having improved split resistance (col. 3 lines 26-27).

Therefore, it would have been obvious to one having ordinary skill in the art at the time applicant's invention was made to provide Paulot et al. with a microporous membrane having an average pore size of from 0.08um to 0.20um and no greater than 0.2um(col. 3 line 30-33) in order to provide a microporous membrane having improved split resistance (col. 3 lines 26-27) as taught by Callahan et al.

4. Claims 27-28 are rejected under 35 U.S.C. 103(a) as obvious over Webber (5219683) in view Callahan et al. (6602593).

As to claim 27, Webber discloses an electrochemical battery cell comprising a housing, a negative electrode, a positive electrode and an electrolyte disposed within the housing (col. 3 lines 41-50), and a separator disposed between the negative and positive electrodes wherein the cylindrical Li/FeS.sub.2 cell with a spiral wound

electrode assembly, the separator is a microporous membrane comprising polyethylene has a thickness of less then 22um (col. 3 lines 41-50 and col. 5 lines 31-32).

As to the maximum effective pore size of 0.08um to 0.20um, Webber fail to disclose that the separator fail to provide a maximum effective pore size of 0.08um to 0.20um. Callahan et al. teaches microporous membrane having an average pore size of from 0.05 to about 2 microns (col. 3 line 30-33) for the purpose of providing a microporous membrane having improved split resistance (col. 3 lines 26-27).

Therefore, it would have been obvious to one having ordinary skill in the art at the time applicant's invention was made to provide Webber with a microporous membrane having an average pore size of from 0.08um to 0.20um (col. 3 line 30-33) in order to provide a microporous membrane having improved split resistance (col. 3 lines 26-27) as taught by Callahan et al.

Referring to the tensile stress of at least 1.75kgf/cm, dielectric breakdown voltage of at least 2400 volts, and a BET specific surface area of 4.0 to 1.5m^2/g, Webber discloses a polyethylene microporous membrane with an average thickness of less than 22um (col. 5 line 44). Since Webber discloses the same materials desired by the applicant, it is expected that separator has a the tensile stress of at least 1.75kgf/cm, dielectric breakdown voltage of at least 2400 volts, and a BET specific surface area of 4.0 to 1.5m^2/g.

As to claim 28, referring to the interfacial capacity of at least 710mAh/cm.sup.3, Webber discloses a metallic lithium anode material and an iron disulfide cathode active material (col. 3 line 46, col. 5 line 43). Since Webber discloses the same materials

desired by the applicant, it is expected that the ratio of cathode interfacial capacity of an electrode assembly interfacial volume of at least 710 mAh/cm.sup.3.

5. Claims 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Webber (5219683) in view Callahan et al. (6602593).

As to claim 29, Webber discloses an electrochemical battery cell comprising a housing, a negative electrode, a positive electrode disposed within the housing, a separator disposed between the negative and positive electrodes, wherein the cell is a cylindrical type Li/FeS.sub.2 cell, with a spiral wound electrode assembly, the separator is a microporous membrane comprising polyethylene has a thickness of less then 22um and the positive electrode comprises an active material (col. 3 lines 41-50).

Referring to the tensile stress of at least 1.75kgf/cm, and dielectric breakdown voltage of at least 2400 volts, Webber discloses a polyethylene microporous membrane with an average thickness of less than 22um (col. 3 lines 50-51). Since Webber discloses the same materials desired by the applicant, it is expected that separator has the tensile stress of at least 1.75kgf/cm and dielectric breakdown voltage of at least 2400 volts.

As to the positive electrode that comprises at least 95 weight percent of iron disulfide, Webber discloses 91 weight percent of iron disulfide (col. 3 line 46). It would have been obvious to one having ordinary skill in the art at the time applicant's invention was made to provide 95 weight percent of iron disulfide, since discovering optimum value of result effective variable involves only routine skill in the art in the absence of unexpected results.

Concerning the discharge capacity of at least 2950mAh when discharged at 200mA continuously to 1.0 volt and a discharge capacity of at least 2600mAh when discharged at 1000mA continuously to 1.0 volt, Webber teaches that each cell was discharged on a 300ohm continuous load and the voltage and ampere-hour cathode efficiency were measured (col. 3 lines 57-59). It would have been obvious to one having ordinary skill in the art at the time applicant's invention was made to provide discharge capacity of at least 2950mAh when discharged at 200mA continuously to 1.0 volt and a discharge capacity of at least 2600mAh when discharged at 1000mA continuously to 1.0 volt, since discovering optimum value of result effective variable involves only routine skill in the art in the absence of unexpected results.

As to the maximum effective pore size of 0.08um to 0.20um, Webber fail to disclose that the separator fail to provide a maximum effective pore size of 0.08um to 0.20um. Callahan et al. teaches microporous membrane having an average pore size of from 0.05 to about 2 microns (col. 3 line 30-33) for the purpose of providing a microporous membrane having improved split resistance (col. 3 lines 26-27).

Therefore, it would have been obvious to one having ordinary skill in the art at the time applicant's invention was made to provide Webber with a microporous membrane having an average pore size of from 0.08um to 0.20um (col. 3 line 30-33) in order to provide a microporous membrane having improved split resistance (col. 3 lines 26-27) as taught by Callahan et al.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jane Rhee whose telephone number is 571-272-1499. The examiner can normally be reached on M-F 9-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jane Rhee
May 24,2006

DAH-WEI YUAN
PRIMARY EXAMINER